

News focus

Crunch points

Researchers are concerned that the 'tipping' point of no return in some climate systems and environments may be approaching sooner rather than later.

Nigel Williams reports.

Underpinning all discussion of climate change has been the recent gradual, but steady, increase in the atmosphere's carbon dioxide content, traceable back to the beginnings of the industrial revolution. Analyses by climate scientists have predicted that this and other changes will lead to a gradual warming of the Earth's climate. But what is becoming increasingly clear is that the picture is not one of gradual change, but potentially dramatic change in climate systems and environments that may alter in ways that become irreversible in the foreseeable future.

A team of climate scientists now report just how serious and imminent such changes might be. They have

ranked the most fragile and vulnerable regions and warned that they are in danger of sudden and catastrophic collapse before the end of the century.

In the study, the researchers identify nine areas that are in gravest danger of collapse. Although the researchers cannot be sure precisely when each region will reach the point of no return, their assessment warns that it may be already too late to save Arctic summer sea ice and the Greenland ice sheet, which they regard as the most immediately in peril. By some estimates, there will not be any Arctic sea ice in the summer months within 25 years.

The next most vulnerable area is the Amazon rainforest, where reduced

rainfall threatens to claim large areas of trees that will not re-establish themselves. The team also expressed concerns over the Boreal forests in the north and have predicted that El Niño, the ocean circulation system that has a profound impact on weather from Africa to North America, will become more intense. The team have called for an early warning to monitor each of these fragile ecosystems.

The study, which was published in the Proceedings of the National Academy of Sciences, represents some of the leading climate scientists from Germany and the UK. The team polled 52 environmental scientists and combined their responses with discussions among 36 leading climate researchers at a workshop in Berlin. Each was asked to rank regions of greatest risk of climate change in this century.



Unreliable: The traditional and predictable Indian monsoons may become more fickle in the near future as a result of climate warming, with serious consequences. (Picture: Hornbil Images/Alamy.)

"There's a perception that global warming is something that will happen smoothly into the future, but some of these ecosystems go into abrupt decline when warming reaches a certain threshold," said Tim Lenton, an environmental scientist at the University of East Anglia, and lead author of the study.

"If we know when the different tipping points are, we can use them to inform targets to limit global warming. It gives us something to aim for," he added.

Last year, the UN's panel of climate scientists warned average temperatures could increase by as much as 6.4°C by the end of the century, with a rise of 4°C most likely. Such a rise poses a threat of food and water shortages to vulnerable parts of the world under many models of subsequent climate change.

In the latest study, the scientists calculate Arctic sea ice will go into irreversible decline when temperatures rise between 0.5°C and 2°C above those at the beginning of the century, a threshold that may already have been crossed. There is already a 50 per cent chance that the Greenland ice sheet will soon begin melting unstopably, although it could take hundreds of years to melt completely. The meltwater would raise global sea levels by seven metres.

Warming of 3–5°C could reduce rainfall in the Amazon by 30 per cent, lengthening the dry season. The Boreal forests could also pass their tipping point, with large swathes dying off over the next 50 years. In Africa, more rainfall may lead to a greening of the Sahel — one of the few potentially positive regional outcomes of climate change — but the West African monsoon could collapse, leading to twice as many unusually dry years by the end of the century. The Indian summer monsoon is predicted to become more erratic and, in the worst-case scenario, begin to flip chaotically, unleashing flash floods one year and droughts the next.

"Society may be lulled into a false sense of security by smooth projections of global change," the authors write. "Our synthesis of present knowledge suggests that a variety of tipping elements could reach their critical point within this century under anthropogenic climate change."

Backs to nature

Biologists are worried that people in the US and elsewhere appear to be showing less interest in the great outdoors. **Nigel Williams** reports.

The announcement, last month, by President Bush of plans to release three million acres of pristine Alaskan forest for logging, mining and development appeared to generate little public opposition, and a new study suggests possible reasons why. Americans appear to be taking fewer and fewer breaks in the country's wilderness areas and national parks, raising alarm bells for biologists and conservationists who see this as vital for garnering public support of

the increasingly threatened natural environment, both in the US and more widely.

Fewer people are visiting national parks and taking part in outdoor activities such as camping, according to new research that suggests people are falling out of love with the natural world.

The study, by US conservationists, published in *Proceedings of the National Academy of Sciences*, discovered an "ongoing and fundamental shift away from nature-based recreation" that they believe could threaten future efforts to preserve wilderness areas. The experts say people now make up to 25 per cent fewer trips than they did in the 1980s, and say the rise in computer games could be to blame.



Lonesome trail: Americans appear to be spending less time visiting the country's national parks and wilderness areas, to the concern of conservationists. (Picture: Photolibrary.)